Pending Claims

The following listing of claims replaces all prior versions and listings of claims in this application:

Listing of Claims

1. (Previously presented) A packaging film comprising:

an antifog film; and

a printed image on the antifog film, the image comprising an electron-beam cured ink.

2. (original) The film of claim 1 wherein the printed image comprises an amount of the cured ink effective to reduce the tendency of the antifog film to form a ghost condensate image of the printed image after the film has been rolled and unrolled.

3. (original) The film of claim 1 wherein:

the antifog film has first and second sides, at least a portion of the first side of the film having an antifogging characteristic; and

the printed image is on at least a portion of the second side of the film, the printed image comprising an effective amount of the cured ink to reduce ghosting after the film has been rolled and unrolled.

4. (original) The film of claim 1 wherein the printed image has an outer surface opposite the antifog film and the outer surface comprises at least a portion of the cured ink.

5. (original) The film of claim 1 wherein:

the antifog film has first and second sides and comprises a coating of antifog agent on at least a portion of the first side of the film; and

the printed image is on at least a portion of the second side of the film.

6. (original) The film of claim 1 wherein the antifog film comprises an antifog agent dispersed in at least a portion of the film.

7. (original) The film of claim 1 wherein the antifog film has a total free shrink at 185°F of at least about 5%.

8.-11. (canceled)

12. (original) The film of claim 1 wherein the cured ink is selected from the group consisting of a cured one-component reactive ink and a cured multi-component reactive ink.

13. (original) The film of claim 1 where the cured ink comprises a cured two-component reactive ink.

14. – 15. (canceled)

16. (original) The film of claim 1 wherein the printed image further comprises a solvent-based ink.

17. (original) The film of claim 1 wherein the antifog film has an average thickness of less than about 3 mils.

18. (original) The film of claim 1 wherein the cured ink has an average gloss of at least about 40% measured in accordance with ASTM D 2457 (60° angle).

19. (Previously presented) The film of claim 1 wherein the printed image is formed at least in part by applying to the antifog film an electron-beam curable ink and subsequently curing the ink to form the cured ink.

20. (Previously presented) The film of claim 1 wherein the printed image is formed at least in part by applying an electron-beam curable ink to the antifog film and subsequently exposing the ink to an effective amount of electron-beam radiation to cure the ink.

21. (Previously presented) The film of claim 20 wherein:

the electron-beam curable ink comprises one or more reactants having reactive sites; and

the radiation exposure comprises electron-beam radiation having an energy of less than about 100 keV in an amount sufficient to polymerize or cross-link at least about 80% of the reactive sites.

22. (Previously presented) The film of claim 21 wherein the radiation exposure comprises electron-beam radiation having an energy of less than about 50 keV in an amount sufficient to polymerize or cross-link at least about 80% of the reactive sites.

23. (Previously presented) The film of claim 20 wherein the electron-beam curable ink includes less than 20 % monofunctional monomer based on the weight of the electron-beam curable ink.

24. (Previously presented) The film of claim 20 wherein the electron-beam curable ink includes less than 20 % reactant diluent based on the weight of the electron-beam curable ink.

25. (original) A packaged food product comprising:

a tray having a food storage side;

a food product resting on the food storage side of the tray; and

the film of claim 1 covering at least the food storage side of the tray.

26. (original) A method of packaging a moisture-containing food product comprising at least partially enclosing the moisture-containing food product within the film of claim 1.

27. (Previously presented) A packaging film comprising:

an antifog film;

a printed image on at least one side of the antifog film; and

an overprint varnish on at least a substantial portion of the printed image, the overprint varnish comprising an electron-beam cured varnish.

28. (original) The film of claim 27 wherein the amount of the cured overprint varnish is effective to reduce the tendency of the antifog film to form a ghost condensate image of the printed image after the film has been rolled and unrolled.

29. (original) The film of claim 27 wherein:

the antifog film has first and second sides, at least a portion of the first side of the film having an antifogging characteristic;

the printed image is on at least a portion of the second side of the film; and

the overprint varnish comprises an effective amount of cured varnish to reduce ghosting.

30. (original) The film of claim 27 wherein the film comprises an antifog agent dispersed in at least a portion of the film.

31. (original) The film of claim 27 wherein the film comprises an antifog coating applied to the first side of the film.

32. (original) The film of claim 27 wherein the antifog film has a total free shrink at 185°F of at least about 5%.

33. – 36. (canceled)

37. (original) The film of claim 27 wherein the cured varnish is selected from the group consisting of a cured one-component reactive varnish and a cured multi-component reactive varnish.

38. (original) The film of claim 27 where the cured varnish comprises a cured two-component reactive varnish.

39. – 40. (canceled)

41. (original) The film of claim 27 wherein the printed image comprises a solvent-based ink.

42. (original) The film of claim 27 wherein the printed image comprises a cured ink selected from the group consisting of radiation-cured inks and thermoset inks.

43. (original) The film of claim 27 wherein the antifog film has an average thickness of less than about 3 mils.

44. (original) The film of claim 27 wherein the cured varnish has an average gloss of at least about 40% measured in accordance with ASTM D 2457 (60° angle).

45. (Previously presented) The film of claim 27 wherein the cured varnish is formed at least in part by applying to the printed image an electron-beam curable varnish and subsequently curing the varnish to form the cured varnish.

46. (Previously presented) The film of claim 27 wherein the cured varnish is formed at least in part by applying to the printed image an electron-beam curable varnish and subsequently exposing the varnish to an effective amount of electron-beam radiation to cure the varnish.

47. (canceled)

48. (Previously presented) The film of claim 46 wherein:

the electron-beam curable varnish comprises one or more reactants having reactive sites; and

the radiation exposure comprises electron-beam radiation having an energy of less than about 100 keV in an amount sufficient to polymerize or cross-link at least about 80% of the reactive sites.

49. (Previously presented) The film of claim 48 wherein the radiation exposure comprises electron-beam radiation having an energy of less than about 50 keV in an amount sufficient to polymerize or cross-link at least about 80% of the reactive sites.

50. (Previously presented) The film of claim 46 wherein the electron-beam curable varnish includes less than 20 % monofunctional monomer based on the weight of the electron-beam curable varnish.

51. (Previously presented) The film of claim 46 wherein the electron-beam curable varnish includes less than 20 % reactant diluent based on the weight of the electron-beam curable varnish.

52. (original) A packaged food product comprising:

a tray having a food storage side;

a food product resting on the food storage side of the tray; and

the film of claim 27 covering at least the food storage side of the tray.

53. (original) A method of packaging a moisture-containing food product comprising at least partially enclosing the moisture-containing food product within the film of claim 27.

54. (Currently amended) A packaging film comprising:

an antifog film; and

a printed image on at least one side of the antifog film; and

an electron-beam ~~cured~~ curable overprint varnish on at least a substantial portion of the printed image.

55. (Previously presented) A method of reducing the tendency of ghosting in an antifog film, the method comprising:

printing an image on a side of an antifog film to form a print side of the film and an opposing side of the film;

applying an electron-beam curable overprint varnish over a substantial portion of the printed image;

subsequently curing the varnish by exposing the electron-beam curable varnish to electron-beam radiation;

subsequently winding the antifog film to form a roll;

subsequently unwinding at least a portion of the antifog film from the roll and exposing the portion of the film to conditions that form a moisture condensate on the opposing side of the film.

56. (Previously presented) A method of forming the film of claim 19 comprising:

providing the antifog film;

applying to the antifog film an electron-beam curable ink; and

subsequently curing the curable ink to form the cured ink.

57. (Previously presented) A method of forming the film of claim 20 comprising:

providing the antifog film;

applying to the antifog film an electron-beam curable ink; and

subsequently exposing the electron-beam curable ink to an effective amount of electron-beam radiation to cure the electron-beam curable ink.

58. (Previously presented) A method of forming the film of claim 21 comprising:

providing the antifog film;

applying to the antifog film an electron-beam curable ink comprising one or more reactants having reactive sites; and

subsequently exposing the electron-beam curable ink to electron-beam radiation having an energy of less than about 100 keV in an amount sufficient to polymerize or cross-link at least about 80% of the reactive sites.

59. (Previously presented) A method of forming the film of claim 22 comprising:

providing the antifog film;

applying to the antifog film an electron-beam curable ink comprising one or more reactants having reactive sites; and

subsequently exposing the electron-beam curable ink to electron-beam radiation having an energy of less than about 50 keV in an amount sufficient to polymerize or cross-link at least about 80% of the reactive sites.

60. (Previously presented) A method of forming the film of claim 23 comprising:

providing the antifog film;

applying to the antifog film a electron-beam curable ink comprising less than 20 % monofunctional monomer based on the weight of the electron-beam curable ink; and

subsequently exposing the electron-beam curable ink to an effective amount of electron-beam radiation to cure the electron-beam curable ink.

61. (Previously presented) A method of forming the film of claim 24 comprising:

providing the antifog film;

applying to the antifog film an electron-beam curable ink comprising less than 20 % reactant diluent based on the weight of the electron-beam curable ink; and

subsequently exposing the electron-beam curable ink to an effective amount of electron beam radiation to cure the electron-beam curable ink.

62. (Previously presented) A method of forming the film of claim 45 comprising:

providing the antifog film;

applying the printed image on at least one side of the antifog film;

applying a electron-beam curable overprint varnish on at least a substantial portion of the printed image; and

subsequently curing the electron-beam curable varnish to form the cured varnish.

63. (Previously presented) A method of forming the film of claim 46 comprising:

providing the antifog film;

applying the printed image on at least one side of the antifog film;

applying a electron-beam curable overprint varnish on at least a substantial portion of the printed image; and

subsequently exposing the electron-beam curable varnish to an effective amount of electron-beam radiation to cure the electron-beam curable varnish.

64. (canceled)

65. (Previously presented) A method of forming the film of claim 48 comprising:

providing the antifog film;

applying the printed image on at least one side of the antifog film;

applying an electron-beam curable overprint varnish on at least a substantial portion of the printed image, wherein the electron-beam curable varnish comprises one or more reactants having reactive sites; and

subsequently exposing the electron-beam curable varnish to electron-beam radiation having an energy of less than about 100 keV in an amount sufficient to polymerize or cross-link at least about 80% of the reactive sites.

66. (Previously presented) A method of forming the film of claim 49 comprising:

providing the antifog film;

applying the printed image on at least one side of the antifog film;

applying an electron-beam curable overprint varnish on at least a substantial portion of the printed image, wherein the electron-beam curable varnish comprises one or more reactants having reactive sites; and

subsequently exposing the electron-beam curable varnish to electron-beam radiation having an energy of less than about 50 keV in an amount sufficient to polymerize or cross-link at least about 80% of the reactive sites.

67. (Previously presented) A method of forming the film of claim 50 comprising:

providing the antifog film;

applying the printed image on at least one side of the antifog film;

applying an electron-beam curable overprint varnish on at least a substantial portion of the printed image, wherein the electron-beam curable varnish comprises less than 20 % monofunctional monomer based on the weight of the electron-beam curable varnish; and

subsequently exposing the electron-beam curable varnish to an effective amount of electron beam radiation to cure the electron-beam curable varnish.

68. (Previously presented) A method of forming the film of claim 51 comprising:

providing the antifog film;

applying the printed image on at least one side of the antifog film;

applying an electron-beam curable overprint varnish on at least a substantial portion of the printed image, wherein the electron-beam curable varnish comprises less than 20 % reactant diluent based on the weight of the electron-beam curable varnish; and

subsequently exposing the electron-beam curable varnish to an effective amount of electron-beam radiation to cure the electron-beam curable varnish.

69. (canceled)

70. (Previously presented) The film of claim 41 wherein:

the antifog film has first and second sides, at least a portion of the first side of the film having an antifogging characteristic;

the printed image is on at least a portion of the second side of the film; and

the electron-beam radiation cured overprint varnish comprises an effective amount of cured varnish to reduce ghosting.

71. (Previously presented) The film of claim 41 wherein the film comprises an antifog agent dispersed in at least a portion of the film.

72. (Previously presented) The film of claim 41 wherein the film comprises an antifog coating on the side of the film opposite the side bearing the printed image.

73. (Previously presented) The film of claim 41 wherein the film has a total free shrink at 185°F of at least about 5%.

74. – 77. (Canceled)

78. (Previously presented) The film of claim 41 wherein the cured varnish comprises a cured one-component reactive varnish.

79. (Previously presented) The film of claim 41 wherein the cured varnish comprises a cured multi-component reactive varnish.

80. (Previously presented) The film of claim 41 wherein the cured varnish comprises a cured two-component reactive varnish.

81. – 82. (canceled)

83. (Previously presented) The film of claim 54 wherein the film comprises an antifog agent dispersed in at least a portion of the film.

84. (Previously presented) The film of claim 54 wherein the film comprises an antifog coating on the side of the film opposite the side bearing the printed image.

85. (Previously presented) The film of claim 54 wherein the film has a total free shrink at 185°F of at least about 5%.

86. -- 89. (canceled)

90. (Previously presented) The film of claim 54 wherein the varnish comprises a curable one-component reactive varnish.

91. (Previously presented) The film of claim 54 wherein the varnish comprises a curable multi-component reactive varnish.

92. (Previously presented) The film of claim 54 wherein the varnish comprises a curable two-component reactive varnish.

93.-- 96. (canceled)

97. (Previously presented) The method of claim 55 wherein the curing comprises exposing the varnish to an effective amount of electron-beam radiation to cure the varnish by a free radical mechanism.

98. (Previously presented) The method of claim 55 wherein:

the overprint varnish comprises an electron-beam curable varnish comprising one or more reactants having reactive sites; and

the curing comprises exposing the electron-beam curable varnish to electron-beam radiation having an energy of less than about 100 keV in an amount sufficient to polymerize or cross-link at least about 80% of the reactive sites.

99. (Previously presented) The method of claim 55 wherein:

the overprint varnish comprises an electron-beam curable overprint varnish comprising one or more reactants having reactive sites; and

the curing comprises exposing the electron-beam curable varnish to electron-beam radiation having an energy of less than about 50 keV in an amount sufficient to polymerize or cross-link at least about 80% of the reactive sites.

100. (Previously presented) The method of claim 55 wherein:

the overprint varnish comprises an electron-beam curable varnish comprising less than 20 % monofunctional monomer based on the weight of the electron-beam curable varnish; and

the curing comprises exposing the electron-beam curable varnish to an effective amount of electron-beam radiation to cure the electron-beam curable varnish.

101. (Previously presented) The method of claim 55 wherein:

the overprint varnish comprises an electron-beam curable varnish comprising less than 20 % reactant diluent based on the weight of the electron-beam curable varnish; and

the curing comprises exposing the electron-beam curable varnish to an effective amount of electron-beam radiation to cure the electron-beam curable varnish.

102. (Previously presented) The method of claim 55 wherein the antifog film comprises an antifog agent dispersed in at least a portion of the antifog film.

103. (Previously presented) The method of claim 55 wherein the antifog film comprises an antifog coating on the side of the film opposite the side bearing the printed image.

104. (Previously presented) The method of claim 55 wherein antifog film has a total free shrink at 185°F of at least about 5%.

105. -- 106. (canceled)

107. (Previously presented) The film of claim 1 wherein the film has a roll form.

108. -- 109. (canceled)

110. (Previously presented) The film of claim 27 wherein the film has a roll form.

111. -- 112. (canceled)